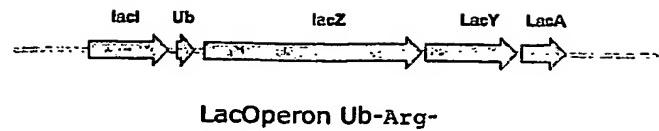


FIG. 1

(a)



(b)

M	Q	I	F	V	K	T	L	T	G	K	T	I	T	L	E	V	E	S	S	D	O	T	I	D		
CGGATAACAA	TTTCACACAG	GAACACGCTA	TGCAGATTTT	CGTCAAGACT	TTGACCGGTA	AAACCATAAC	ATTGGAAGTT	GAATCTTCGG	ATACCATCGA																	
GGCTATTGTT	AAAGTGTGTC	CTTGTGAT	ACGTCTAAA	GCAGTCTGA	AAC TGGCCAT	TITGGTATTG	TAACCTTCAA	CTTAGAAGGC	TATGGTAGCT																	
D	N	V	K	S	K	I	G	D	K	E	G	I	P	P	D	Q	Q	R	L	I	F	A	G	K	Q	L
CAACGTTAACG	TCGAAAATTC	AAGACAAGGA	AGGTATCCCT	CCAGATCAAC	AAAGATTGAT	CTTGCCGGT	AAGCAGCTAG	AAGACGGTAG	AACGGTGTCT																	
GTGTCATTC	AGCTTTAACG	TTCCTGTCCT	TCCATAGGGA	GGTCTAGTGT	TTTCTAACTA	AAAACGGCCA	TTCGTCGATC	TTCTGCCATC	TTGGCACAGA																	
D	Y	N	I	Q	K	E	S	T	L	H	L	V	L	R	G	G	R	H	G	S	G	A	V	L	L	
GATTACAAC	TTCAGAAGGA	GTCCACCTTA	CATCTTGTGC	TAAGGCTAAG	AGGTGGTAGG	CACGGATCCG	GAGCTTGGCT	GTTGCCCCTC	TCACTGGTGA																	
CTAATGTTGT	AACTTCTCCT	CAGGTGAAT	GTAGAACACG	ATTCCGATTC	TCCACCATCC	GTGCTTAGGC	CTCGAACCGA	CAACGGCAG	AGTGAACACT																	
-K	R	K	T	T	L	A	P	N	T	Q	T	A	S	P	R	A	L	A	D	S	L	M	Q	L	A	
AAAGAAAAAC	CACCCCTGGCG	CCCAATACCG	AAACCGCTC	TCCCCGGCGG	TTGGCCGATT	CATTAATGCCA	GCTGGCACGA	CAGGTTTCCC	GACTTGTCTG																	
TTTCTTTTG	GTGGGACCGC	GGGTTATGCCG	TTTGGCGGAG	AGGGGCGCGC	AAACGGCTAA	GTATTACGT	CGACCGTGCT	GTCCAAAGGG	CTGAAATAGC																	
-R	L	A	A	H	P	P	F	A	S	V	R	N	S	E	E	A	R	T	D	R	P	B	Q	Q	L	
GGTGGGCGGCG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG	GGGCGGCGG		

FIG. 2

## k12-e1

	Met	Gln	Asp	Phe	Val	Lys	Thr	Leu	Thr	Gly	Lys	Thr	Asp	Leu	Glu	Val	Glu	Ser	Asp	Thr	Asp	Asn	Val	Lys	Ser	Lys
5001	ACAGGAACA	GCTATGAGA	TITTCGTCAA	GACTTGGACC	GGTAAAAACCA	TAACATIGGA	AGTTGAATCT	TCCGATACCA	TGCGAACCGT	TAAGTCGAAA	TGTCCTTGTG	CGATACGTCT	AAAGCAGT	CTGAACTGG	CCATTGTTGT	ATTCATACCT	TCAACTTGA	AGGCTATGGT	AGCTTGCGCA	ATTCACTGTT						
5101	ATTCAAGACA	AGGAAGGTAT	CCCTCCAGAT	CAACAAAGAT	TGATCTTGGC	CGGTAAAGCA	CTAGAAAGCC	GTAGAACCGT	GTCTGATTAC	AAACATTCAGA	TAAGTCCTGT	TCTTTCACATA	GGGAGGTCTA	GTGTTTCTA	ACTAGAAACCG	CCCATTCGTC	GATCTTCTGC	CATCTTGGCA	CAGACTAAAT	TGTTAAGTGT						
5201	T	Ala	Gln	Ser	Thr	Leu	Val	Arg	Leu	Asp	Asp	Leu	Asp	Leu	Asp	Asp	Leu	Asp	Asp	Asp	Asp	Asn	Asp	Asp	Asp	Asp
5301	TTGAGGADAT	CCGCCCTTCG	CCAGCTGGCG	TAATAGGCGA	GAAGGCGCGCA	CCGATCCCG	TTTCCAAACG	TTGCGCGCGC	TAATAGCGCA	TAAGGCGCGG	AGCTGCTGTA	GGGGGAGG	GGCTGACCCG	ATTATGGCTT	CTCCGCGCG	GGCTGCGGG	TTGGGTTGTC	ACGGCGTGG	ACTTACCGCT	TACCGCGGAA						

## k12-e2

	Met	Gln	Asp	Phe	Val	Lys	Thr	Leu	Thr	Gly	Lys	Thr	Asp	Leu	Glu	Val	Glu	Ser	Asp	Thr	Asp	Asn	Val	Lys	Ser	Lys	
5001	ACAGGAACA	GCTATGAGA	TITTCGTCAA	GACTTGGACC	GGTAAAAACCA	TAACATIGGA	AGTTGAATCT	TCCGATACCA	TGCGAACCGT	TAAGTCGAAA	TGTCCTTGTG	CGATACGTCT	AAAGCAGT	CTGAACTGG	CCATTGTTGT	ATTCATACCT	TCAACTTGA	AGGCTATGGT	AGCTTGCGCA	ATTCACTGTT							
5101	ATTCAAGACA	AGGAAGGTAT	CCCTCCAGAT	CAACAAAGAT	TGATCTTGGC	CGGTAAACCG	CTAGAAAGCC	GTAGAACCGT	GTCTGATTAC	AAACATTCAGA	TAAGTCCTGT	TCTTTCACATA	GGGAGGTCTA	GTGTTTCTA	ACTAGAAACCG	CCCATTCGTC	GATCTTCTGC	CATCTTGGCA	CAGACTAAAT	TGTTAAGTGT							
5201	T	Ala	Gln	Ser	Thr	Leu	Val	Arg	Leu	Asp	Asp	Leu	Asp	Leu	Asp	Asp	Leu	Asp	Asp	Asp	Asp	Asn	Asp	Asp	Asp	Asp	
5301	AGGAGTCCAC	CTTACATCTT	GTGCTAAGGC	TAAGAGGTGG	TTTGCACCGA	CCCGGAGCTT	GGCTGTTGCG	CGTCTCTACTG	GTGAAAAGAA	AAACCAACCT	TCTCAGGTG	GAATGTAGAA	CACGATTCAC	ATTCTCCAC	AAACGCTGAA	CCGACAAACGG	GCAGACTGAC	CACCTTTCTT	TTTGGTGGGA								

## k12-e3a

	Met	Gln	Asp	Phe	Val	Lys	Thr	Leu	Thr	Gly	Lys	Thr	Asp	Leu	Glu	Val	Glu	Ser	Asp	Thr	Asp	Asn	Val	Lys	Ser	Lys		
5001	ACAGGAACA	GCTATGAGA	TITTCGTCAA	GACTTGGACC	GGTAAAAACCA	TAACATIGGA	AGTTGAATCT	TCCGATACCA	TGCGAACCGT	TAAGTCGAAA	TGTCCTTGTG	CGATACGTCT	AAAGCAGT	CTGAACTGG	CCATTGTTGT	ATTCATACCT	TCAACTTGA	AGGCTATGGT	AGCTTGCGCA	ATTCACTGTT								
5101	ATTCAAGACA	AGGAAGGTAT	CCCTCCAGAT	CAACAAAGAT	TGATCTTGGC	CGGTAAACCG	CTAGAAAGCC	GTAGAACCGT	GTCTGATTAC	AAACATTCAGA	TAAGTCCTGT	TCTTTCACATA	GGGAGGTCTA	GTGTTTCTA	ACTAGAAACCG	CCCATTCGTC	GATCTTCTGC	CATCTTGGCA	CAGACTAAAT	TGTTAAGTGT								
5201	T	Ala	Gln	Ser	Thr	Leu	Val	Arg	Leu	Asp	Asp	Leu	Asp	Leu	Asp	Asp	Leu	Asp	Asp	Asp	Asn	Asp	Asp	Asp	Asp	Asp		
5301	GGCCAAACAT	ACCGAAACAT	CTCTCCAC	CCACACTTAC	CCCTGGAC	AAATCCGAC	TTTCCGAC	CCGCGGAC	CCGCGGAC	CCGCGGAC	GGCGGAGGTTA																	

## k12-n3

	Met	Lys	Lys	Pro	Asp	Le	Ty	Leu	Asp	Ty	Ser	Ala	Ser	Thr	Met	Le	The	Asp	Ser	Leu	Ala	Val	Val	Lys	Gn	Arg	Arg	Asp	Ty	Gln
5001	ACAGGAACA	GCTATGAAAC	TGCGGATTAT	ACGCCGAGCA	CCGTTGATTAG	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	GGCGGAGGTTA	
5101	AAACCTGGCG	TTACCCCAACT	TAATGGCGTT	GGCACACATG	CCGCTTTCGCT	CGCGGCGGCG	TTTACGGCGGCT																							

## K12-n5

	Mt	Gln	Gln	Gln	Gln	Asn	Arg	Lys	Thr	Ser	Ser	Thr	Met	Le	The	Asp	Ser	Leu	Ala	Val	Val	Leu	Gln	Arg	Arg	Asp	Ty	Gln	
5001	ACAGGAACA	GCTATGATGC	AGGAAGGCCA	GAACGCCAAA	ACCGAGCAGCA	CCATGATTAC	GGGTTTACGTC	GGCGGAGGTTA	GGCGGAGGTTA																				
5101	AACCTGGCG	TTACCCCAACT	TAATGGCGTT	GGCACACATG	CCGCTTTCGCT	CGCGGCGGCG	TTTACGGCGGCT																						

FIG 3a

(b)

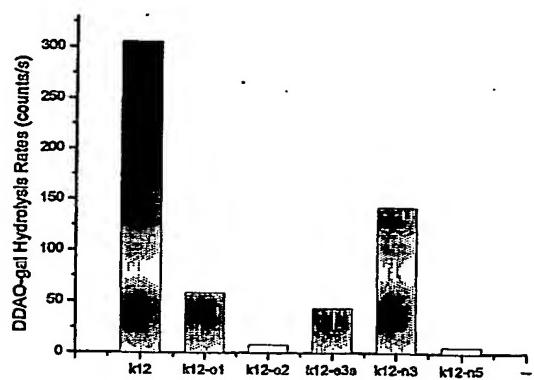


FIG 3b

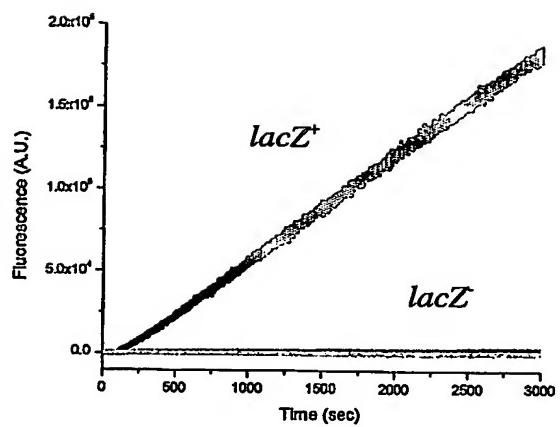


FIG. 4

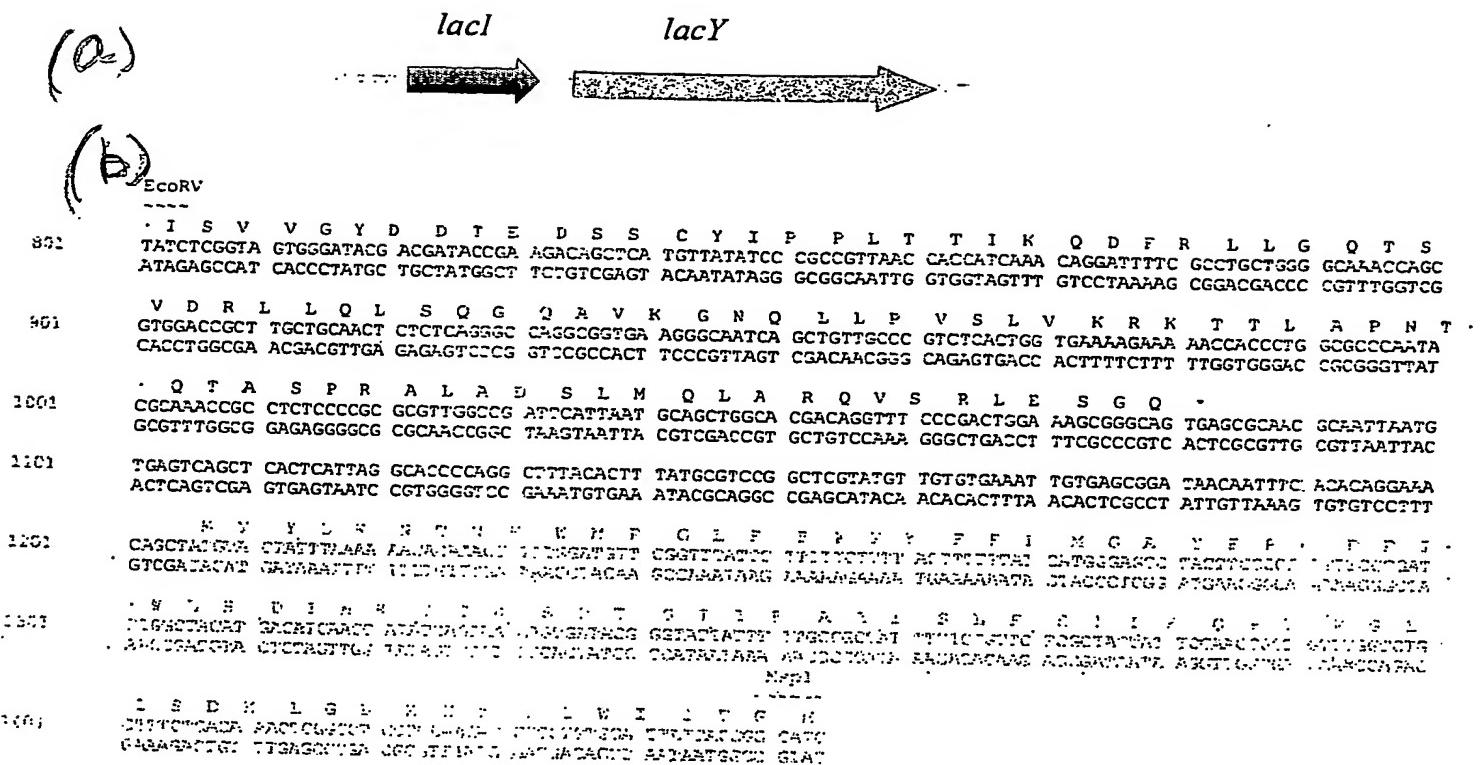


FIG. 5

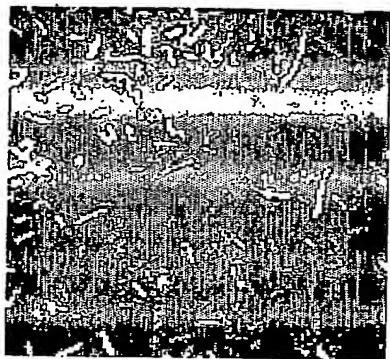


FIG. 6.

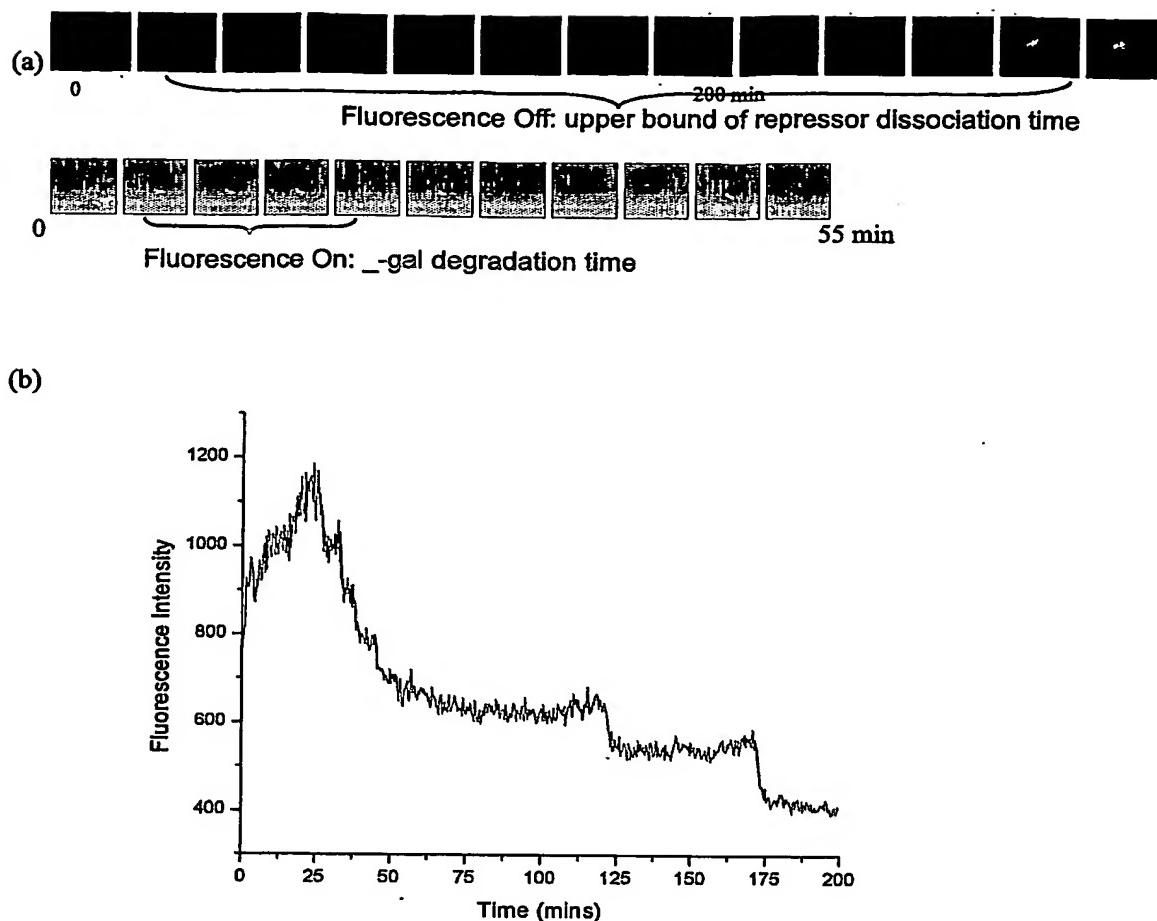
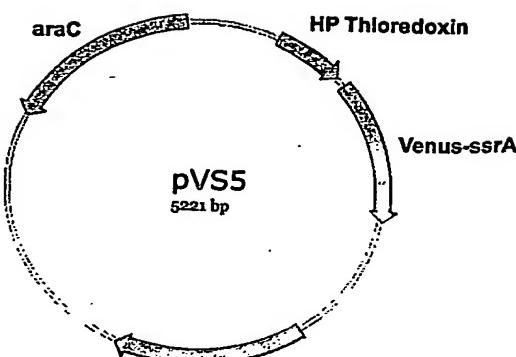


FIG. 7

(a)



(b)

Sequence data for the pVS5 vector:

```

    Ser Lys Glu Cys Cys Leu Phe Thr Cys Val Val Pro Ile Leu Val Cys Lys Leu Asp Glu Asp Val Asn Glu His Lys
    ACAAGCTGGG AATTGATCCC TTACCAAGCA AGGGCGAGGA GCTGTTCACC GGGGTTGGTC CCATCCCTGGT CGAGCTGGAC GGGGACGTAA ACGGCCACAA
    TGTTCCGACCC TTAACTAGGG AAGTGGTGT TCCCCCTCT CGACAAGTGG CCCCACCCAGG GTTGGACCA GCTGACCTG CCGCTGCATT TCCCCGTGTT
    Lys Phe Ser Val Ser Glu Glu Cys Glu Asp Ala Thr Tyr Glu Lys Leu Thr Leu Lys Leu Ile Cys Thr Thr Glu Lys Leu Pro Val Pro Tyr Pro Thr
    GTTCAGCGTG TCCGGGAGG GCGAGGGCGA TCCCCACTAC GGCAAGCTGA CCCCTGAAGCT GATCTGCACC ACCGGCAAGC TGCCCGTGCCT CTGGCCCACC
    CAAGTGCAC AGGCCGCTCC CGCTCCCGCT CGGGTGGATC CGGTTCGACT GGGACTTCGA CTAGACGTGG TGGCCGTTCG AGGGGACGG GACCGGGTGG
    Leu Val Thr Th Leu Glu Tyr Glu Leu Glu Cys Phe Ala Arg Tyr Pro Asp His Met Lys Glu His Asp Phe Lys Ser Ala Met Pro Glu Glu Tyr Val
    CTCGTGACCA CCTCTGGCTA CGGCCCTGCAG TCGCTTCGCC GCTAACCCCGA CCACATGAAG CAGCAGGACT TCTTCAGTC CGCCATGCC GAAGGCTACG
    GAGCACTGGT GGGACCCGAT GCGGACGGT CGCAAGCGGG CGATGGGCT GGTGTACTTC GTCTGCTGTGA AGAAGTTTCAG GCGGTACGGG CTTCCGATGC
    Val Glu Glu Arg Thr Ile Phe Phe Lys Asp Asp Glu Asn Tyr Lys Thr Arg Ala Glu Val Lys Phe Glu Glu Asp Thr Leu Val Asn Arg Ile Glu Leu Lys
    TCCAGGAGG CACCATCTTC TTCAAGGAGC AGGGCAACTA CAAGACCCCG GCGGAGGTGA AGTTCGAGGG CGACACCTGC GTGAACCCCA TCGAGCTGAA
    AGGTCTCGC GTGGTAGAAG AGTTCCTGC TCCCGTTGAT GTTCTGGCC CGGCTCCACT TCAAGCTCCC GCTGTGGAC CACTTGGCT AGCTCGACTT
    Lys Glu Ile Asp Phe Lys Glu Asp Glu Asn Ile Leu Glu His Lys Leu Glu Tyr Asp Asn Ser His Asn Thr Val Val Asp Lys Glu Lys Asn
    GGGCATCGAC TTCAAGGAGG AGGGCAACAT CCTGGGGCAC AACCTGGAGT ACAACTACAA CGCCACAAAC GTCTATATCA CGCCCGACAC GCAGAACAC
    CCCGTAGCTG AAGTTCCTCC TGGCGTTGTA GGACCCCGTG TTCGACCTCA TGTGATGTT GTCGGTGTTG CAGATATA GTGGGCTGTT CGTCTTCTTG
    Glu Ile Lys Ala Asn Phe Lys Ile Arg His Asn Ile Glu Asp Glu Val Glu Leu Ala Asp His Tyr Glu Glu Asn Thr Pro Ile Glu Asp Glu Pro Val
    GGCATCAAGG CCAACTCTAA GATCCGCCAC AACATCGAGG ACGGGGCGGT CGAGCTGGCC GACCCTACCC ACCAGAACAC CCCCATGGC GACGGCCCCG
    CGCTAGTTCC GTGTGAGTT CTAGGGGTG TTGTAGCTTC TCCCCCGCA CGTCGAGGG CGTGTGATGG TGCTCTTGTG GGGGTAGCCG CTGCCGGGGC
    Val Leu Leu Pro Asp Asn His Tyr Leu Ser Ser Glu Ser Ala Leu Ser Lys Asp Pro Asn Glu Lys Arg Asp His Met Val Leu Leu Glu Phe Val Thr Ala
    TGCTGCTGCC CGACAAACAC TACCTGAGCT ACCAGTCCGG CCTGAGCAAA GACCCCAACG AGAAGCGCGA TCACATGGTC CTGCTGGAGT TCGTGAACCGC
    ACCGACGGC GCTGTGGTG ATGCACTCGA TGGTCAGGG CGACTCGTT CTGGGGTTC TCTTGGCCT AGTGTACCA GACGACCTCA AGCACTGGGG
    Ala Ala Glu Ile Thr Leu Glu Met Asp Glu Leu Tyr Lys Ala Ala Asn Asp Glu Asn Tyr Ala Leu Ala Ala -- 
    CGCCGGGATC ACTCTCGCA TGGACGAGCT GTACAAGGC GCCAACCGACG AGAAACTACGC CTTAGCCGCC TAAGAAAAAGG GCGAGGCTAA GCTTGAAGGT
    GCGGCCCTAG TGAGAGCCGT ACCTGCTGA CATGTCGG CGGTGCTGC TCTTGATGG GAATGGCGG ATTCTTTCC CGCTCGAGTT CGAACCTCCA
  
```

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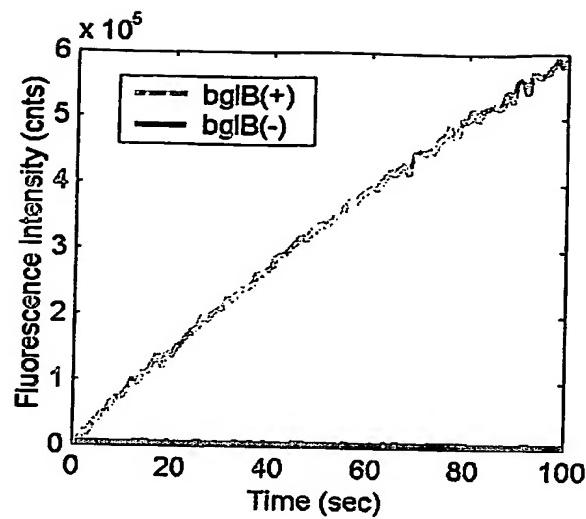


FIG. 9

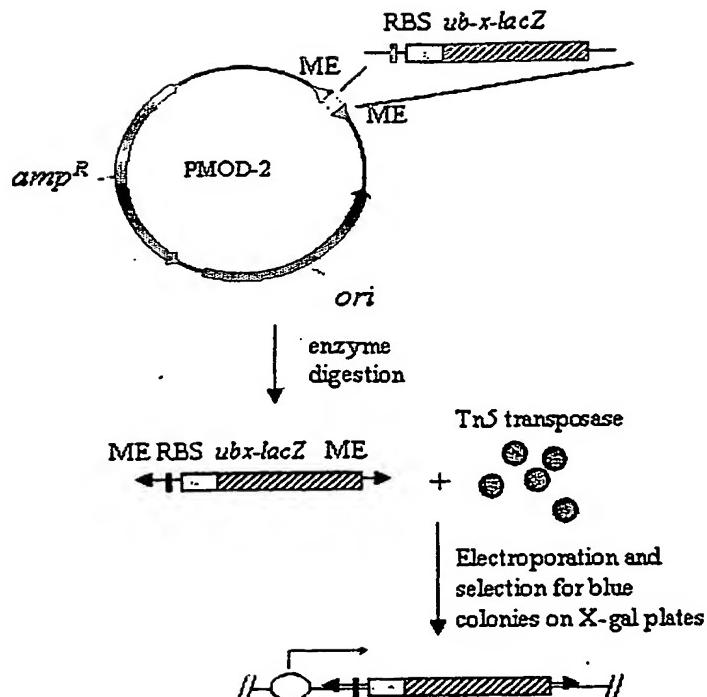


FIG. 10

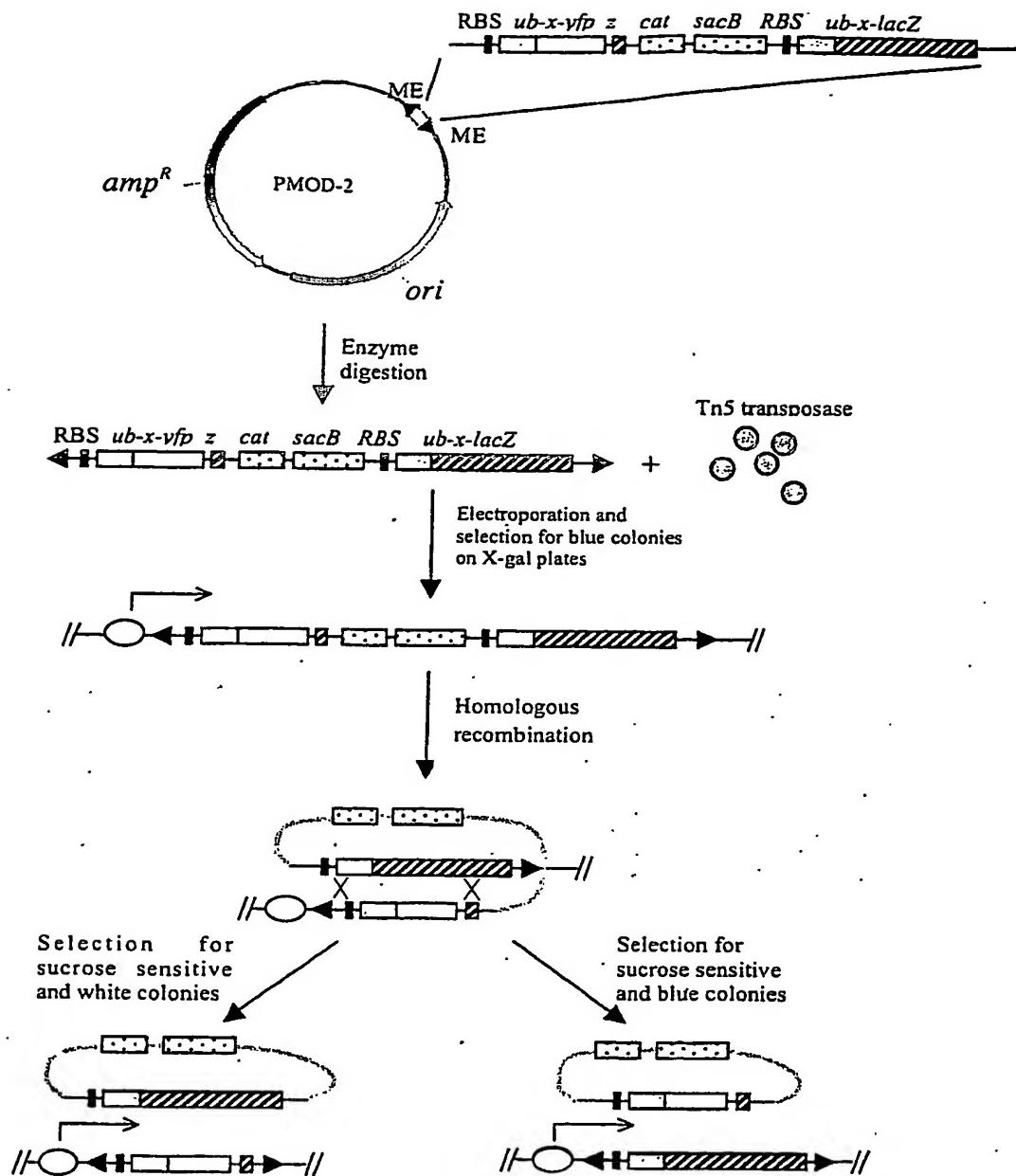


FIG 11

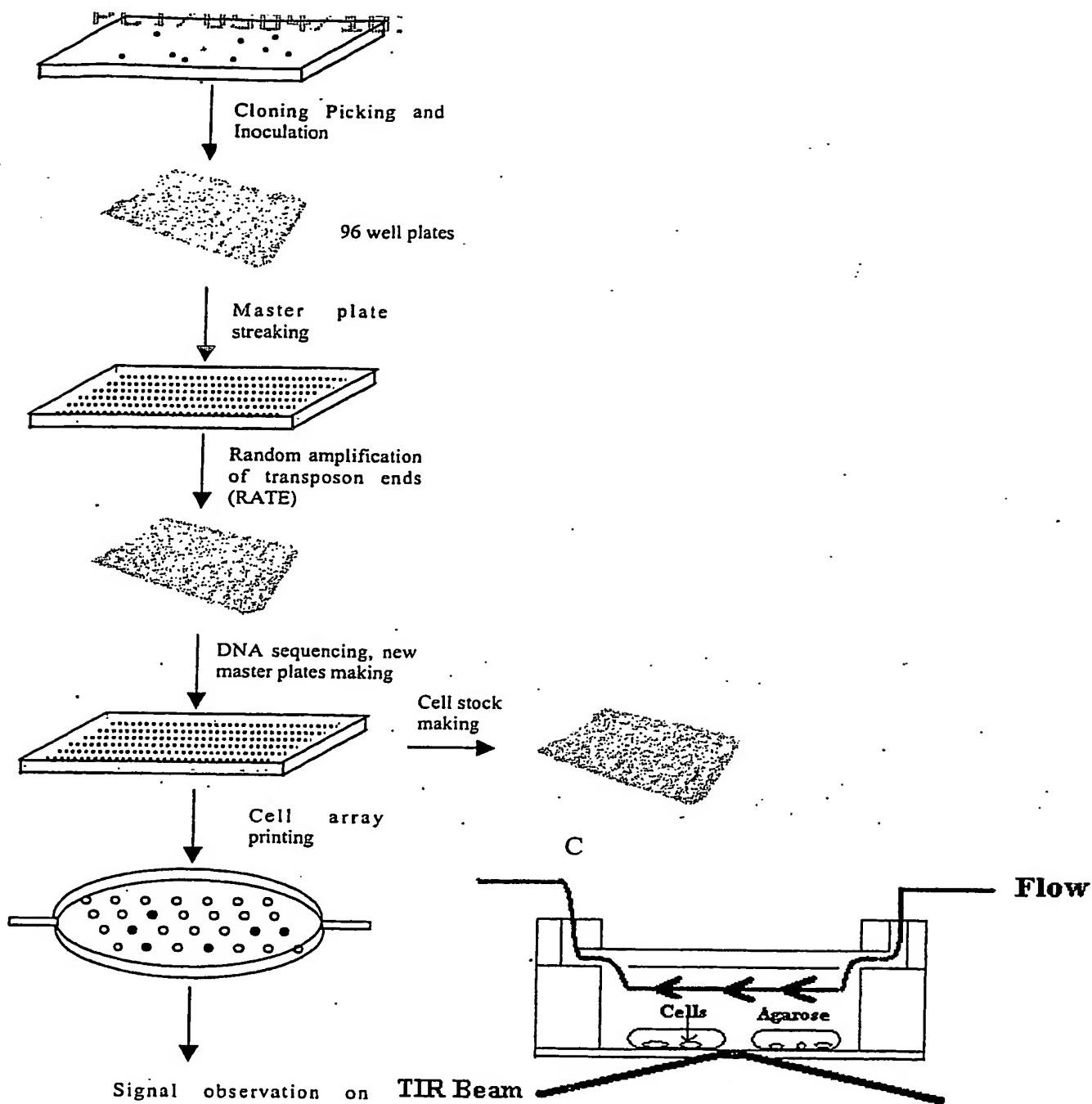
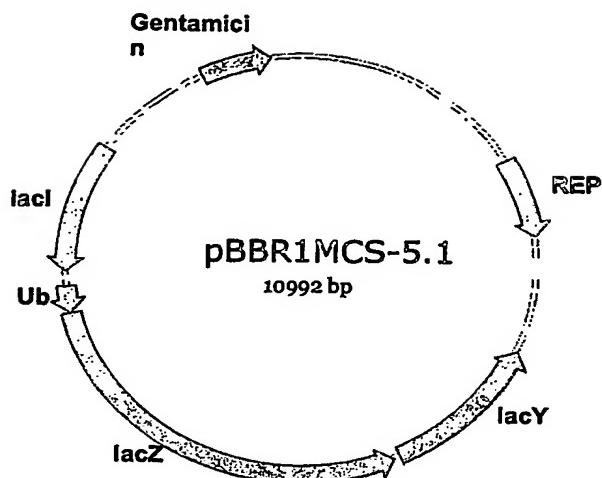


FIG. 12

(a)



(b)

	Met	Gln	Asn	Phe	Val	Ile	Thr	Leu	Thr	Gly	Lys	Thr	Asn	Thr	Leu	Glu	Val	Glu	Ser	Ser	Asp	Thr	Asp
GGCGGATAACA	ATTTCACACAA	GGAAACAGCT	ATGCCAGATT	TGCTCAAGAC	TTTGACCGGT	AAAACCATAA	CATTGGAAGT	TGAATCTTC	GATACCACATCG														
CGCCTATTGT	AAAAGTGTGT	CCTTGTGCA	TAGCTAAA	AGCAGTCTG	AAACTGGCC	TTTTGGATT	GTAAACCTTC	ACTTAGAAGG	CTATGGTAGC														
Asp	Asn	Val	Ile	Ser	Ile	Gln	Asp	Ile	Glu	Gly	Asp	Pro	Pro	Asp	Glu	Gln	Arg	Asp	Gly	Arg	Thr	Leu	Ser
ACAAAGTTAA	GTCGAAAATT	CAAGACAAGG	AAAGTATCCC	TCCAGATCAA	CAAAAGTTGA	TCTTGCCTGG	TAAGCAGCTA	GAAGACGGTA	GAACGCTGTC														
TGTTGCAATT	CAGCTTTAAC	GTTCGTTTCC	TTCCATAGGG	AGGTCTAGTT	GTTCCTAACT	AGAACCGGCC	ATTCTGTGAT	CTTCTGCCAT	CTTGGCACAG														
Ser	Asp	Trp	Asn	Ile	Gln	Ile	Glu	Ser	Thr	Leu	His	Leu	Val	Leu	Arg	Gly	Gly	Leu	Thr	Asp	Ser	Leu	Ala
TGATTACAAC	ATTTCAGAGG	AGTCACCTT	ACATCTTGTG	CTAAGGCTAA	GAGGTGGT	GGGGTGGT	GGGGTGGT	GGGGTGGT	GGGGTGGT														
ACTAATGTTG	TAAGTCTTCC	TCAGGTGGAA	TGTAGAACAC	GATTCCGATT	CTCCACCA	CTCCACCA	CTCCACCA	CTCCACCA	CTCCACCA														
Arg	Asp	Trp	Glu	Asn	Pro	Gly	Val	Thr	Gln	Leu	Asn	Arg	Leu	Ala	Ala	Pro	Pro	Pho	Ala	Ser	Trp	Arg	Asn
CGTGACGGG	TTAACCGTGG	GGTAAACGAA	GTAAATGGG	TTTCAACGAA	GGCGGTTG	GGCGGTTG	GGCGGTTG	GGCGGTTG	GGCGGTTG														
GGGAAACCC	TTTGCGACG	GGGAAACCC																					

FIG. 13

(a)

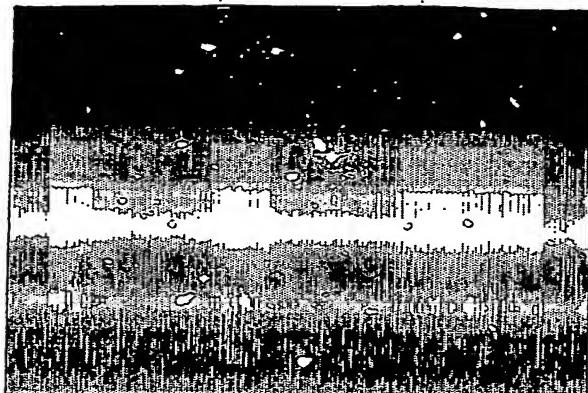


Figure 1. Fluorescence image of *Shewanella oneidensis* cells containing *lacZ* plasmid taken with a through-lens total internal reflection (TIR) fluorescence microscope. Each bright spot is a single cell, in which DDAO generated by the basal level expression of  $\beta$ -gal is detected with high sensitivity.

(b)

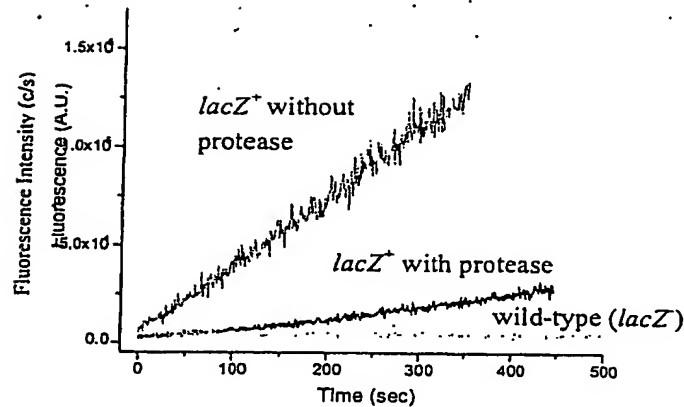
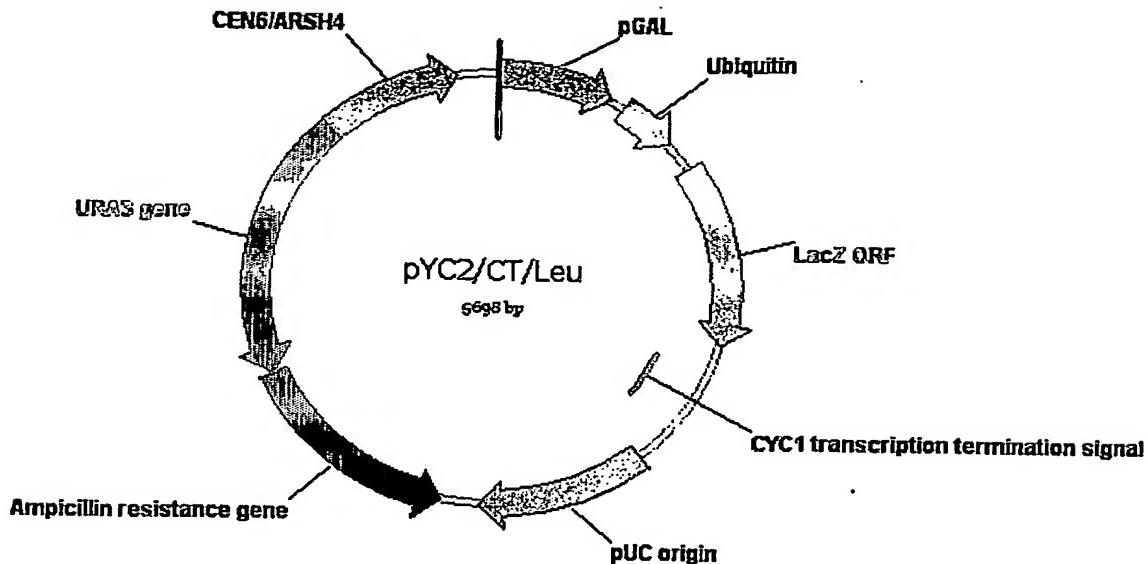


Figure 2. DDAO fluorescence generated by hydrolysis of DDAO-Gal with the wild-type *Shewanella oneidensis* cells (light gray lines), with cells containing *lacZ* plasmid (gray lines), and cells containing both *lacZ* and the ubiquitin-specific protease plasmid (black lines).

FIG 14

FIG. 1 (a)



(b)

```

1  |ACGGATTAGA AGCCGCCGAG CGGGTGACAG CCCTCCGAAG GAAGACTCTC CTCCGTGCGT CCTCGTCTTC ACCGGTCGCG
|TGCTTAATCT TCGGGCGCTC GCCCACTGTC GGGAGGCCTTC CTTCTGAGAG GAGGCACGCA GGAGCAGAAG TGGCCAGCGC
81  |TTCCCTAACAC GCAGATGTGC CTGGCGCCGC ACTGCTCCGA ACAATAAGA TTCTACAATA CTAGCTTTTA TGTTTATGAA
AAGGACTTTG CGTCTACACG GACCGCGGGCG TGACGAGGCT TGTTATTCTT AAAGATTTAT GATCGAAAAT ACCAATACCT
161  |GAGGAAAAT TGGCACTAAC CTGGCCCCAC AACCTTCAA ATGAACGAT CAAATTAACA ACCATAGGAT GATAATGCGA
CTCCCTTTA ACCGTCATTG GACCGGGGTG TTTGGAAGTT TACTTGCTA GTTAATTGT TGGTATCCTA CTATTACGCT
241  |TTAGTTTTT AGCCCTATTCT CTGGGGTAAAT TAATCAGCGA AGCCGATGATT TTGATGCTAT TAACAGATAT ATAAATGCAA
AATCAAAAAA TCGGAATAAA GACCCCATTA ATTAGTCGCT TCGCTACTAA AACTAGATA ATTGTCTATA TATTTCAGGT
321  |AAACTGCATA ACCACTTTAA CTAACTACTT CAACATTTTC GGTTTGTATT ACTTCTTATA CAAATGTAAT AAAAGTATCA
TTTGACGTAT TGGTGAATT GATTATGAAA GTTGTAAAAG CAAACATAA TGAAGAATAA GTTACATTA TTTTCAATAGT
401  |ACAAAAAAATT GTAAATATACCT CTCTATACCTT AAACGTCAAAG GAGAAAAAAC CCCGGATCGG ACTACTAGCA GCTGTAATAC
TGTTTTTAA CAATTATATG GAGATATGAA ATTGCAGTTC CTCTTTTG GGGCCTAGCC TGATGATCGT CGACATTATG
481  |Met Gh Ile Phe Val Lys Thr Leu Glu Ile Ile Ile Thr Leu Glu
4  |GACTCACTAT AGGGAAATTAA AAGCTTGGTA CCATGCAGAT TTTCTGCAAG ACTTTGACCG GTAAAACCAT AACATTGGAA
CTGAGTGATA TCCCCTTAAAT TTGCAACATT GGTACGCTA AAACCGATTC TGAAACTGGC CATTGGTA TTGTAACCTT
3  |Val Gl Ser Ser Asp Thr Le Asp Val Lys Ile Gl Ser Pro Pro Asp Gl Gl Arg Leu
561  |GTTGAATCTT CCGATACCA CGACAACGTT AAGTCGAAAA TTCAAGACAA GGAAGGATTC CCTCCAGATC AACAAAGATT
CAACCTTAGAA GCCTATGGTA GCTGTTGCAA TTCAGCTTTT AAGTTCTGTT CCTTCCATAG GGAGGCTAG TTGTTCTAA
3  |Ile Le Phe Asp Gl Lys Gl Leu Gl Asp Gl Arg Thr Leu Ser Asp Ile Asn Ile Gl Lys Gl Ser Thr Leu His Leu Val
641  |GATTTTGGC GTAAAGCAGG TAGAACCGGG TGTAAACGCTG TGTGATTACA ACATTCAGAA GGAGTCCACC TTACATCTTG
CTAGAAACGG CCATTCTGTCC ATCTTCGCGC ATCTTCGCGAC AGACTAATGT TGTAAAGCTT CCTCAGGTGG AATGTAGAAC
3  |Val Leu Arg Leu Arg Gl Gl Leu Gl Ser Gl Asp Leu Pro Val Ser Leu Val Lys Arg Lys Thr Thr Leu
721  |TGCTAAGGCT AAGAGGTGGT TTGACCGAT CCGGAGCTTG GCTGTTGCC GTCTCACTGG TGAAAAGAAA AACCAACCTG
ACGATTCCGA TTCTCCACCA AACGTCCTA GGCTCGCAAC CGACAAACGGG CAGAGTGACC ACTTTCTTT TTGGTGGGAC
3  |Ala Phe Asn Thr Gl Ser Phe Arg Ala Leu Ala Asp Ser Leu Met Gl Leu Asp Gl Val Ser Arg Leu Asn
801  |GCGCCCAATA CGCAAACCGC CTCTCCCCGC GCGTGGCCCG ATTCAATTAA GCAGCTGGCA CGACAGGTTT CCCGACTTAA
CGCGGGTTAT GCGTTTGGCG GAGAGGGGGCG CGCAACCGGC TAAGTAATA CGTCGACCGT GCTGTCCAAA GGCTGAAATT
3  |Asn Arg Leu Ala His Pro Phe Phe Ala Ser Thr Arg Asp Ser Gl Gl Asp Arg Thr Asp Arg Phe Ser Gl Gl Leu Arg
881  |TCGGCTTGCA GCACATCCCC CTTTCGGCAG CTGGCGTAAT AGCGAAGAGG CCCGCACCGA TCGCCCTTCC CAAACAGTTGC
AGCGGAACGT CGTGAGGG GAAACGGTC GACGGCATTCA CGCTCTCC GGGCGTGGCT AGCGGGAGG GTGTCACCG
3  |Arg Ser Leu Asn Gl Gl Thr Arg Phe Ala Thr Phe Pro Ala Pro Glu Ala Val Pro Glu Ser Thr Leu Glu Gl Asp Leu
961  |GCAGCCTGAA TGGCGAAATGG CGCTTTCGCT GTGTTCCGGC ACCAGAAGCG GTGCCGAAA GCTGGCTGGA GTGCCGATCTT
CGTCGGACTT ACCGCTTACCG CCGAACCGGA CCAAAGGCCG TGGTCTTCCG CACGGCCTT CGACCCGACCT CACCGCTAGAA
3  |Pro Glu
1041  |CCTGAGG
     |GGACTCC

```

FIG. 15

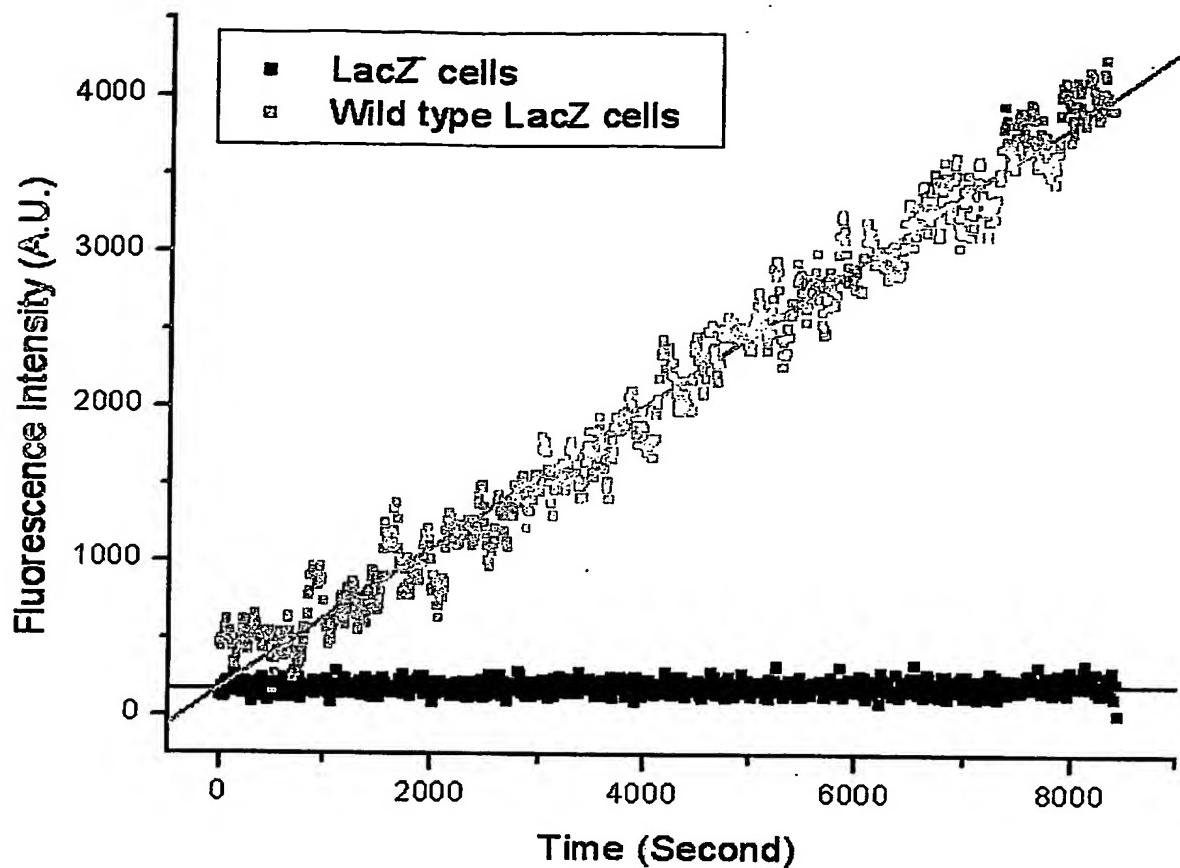


FIG. 16

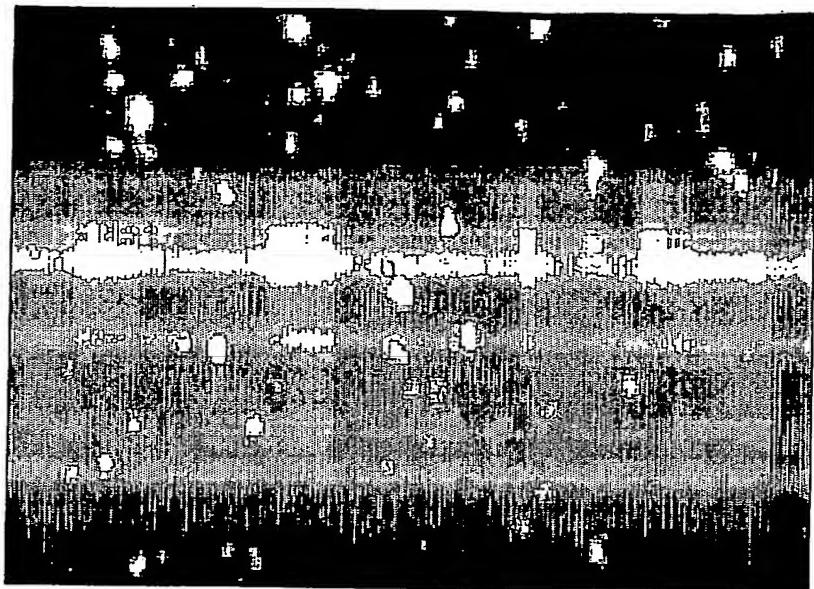
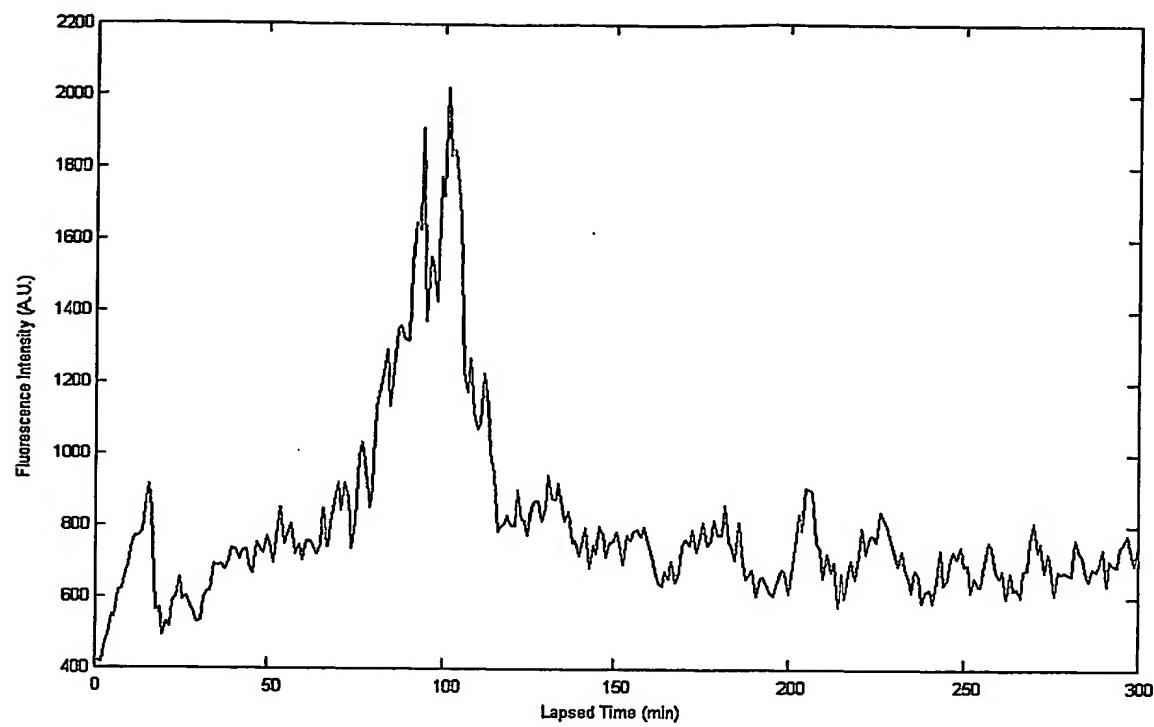


FIG. 17



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